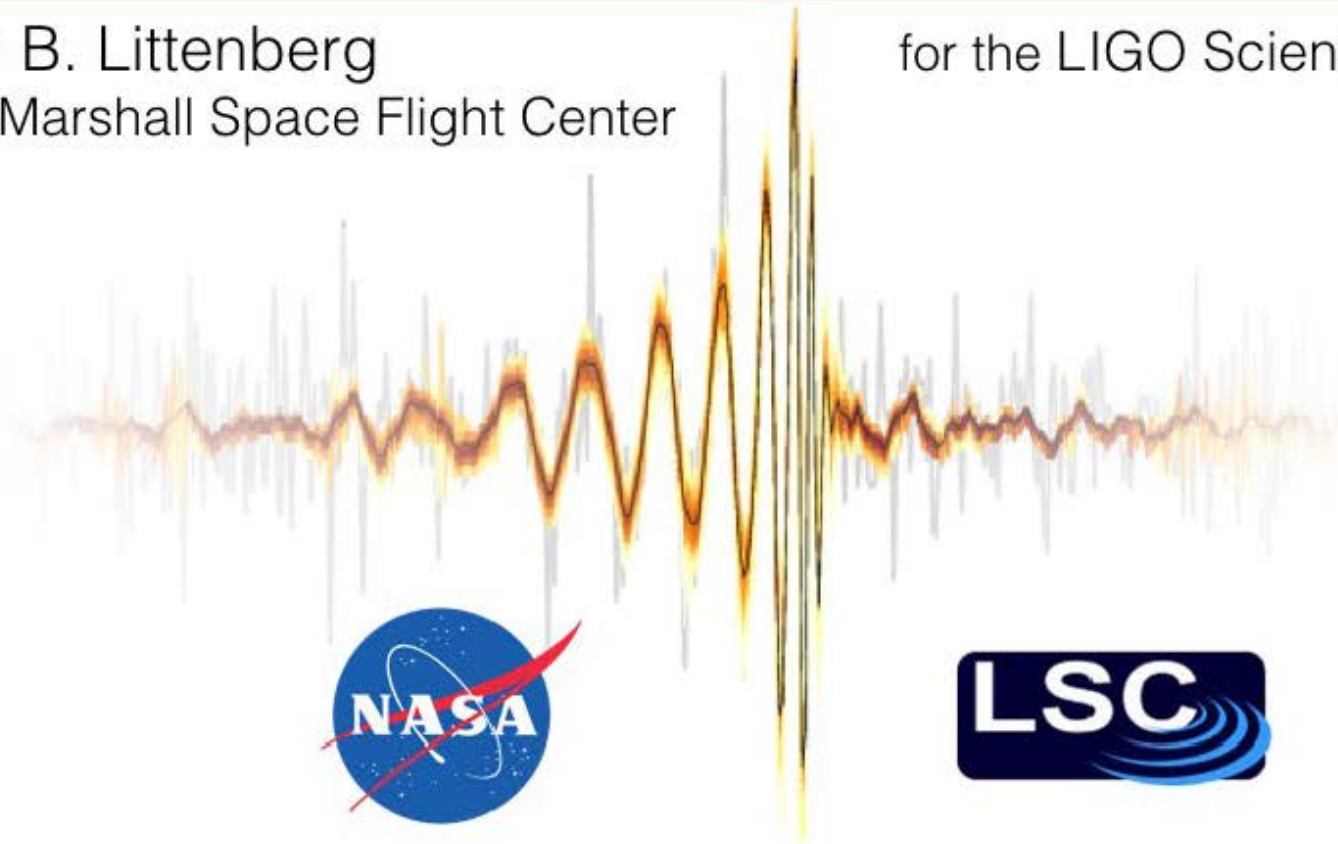


# Looking ahead at LIGO's 2<sup>nd</sup> Observing Campaign

---

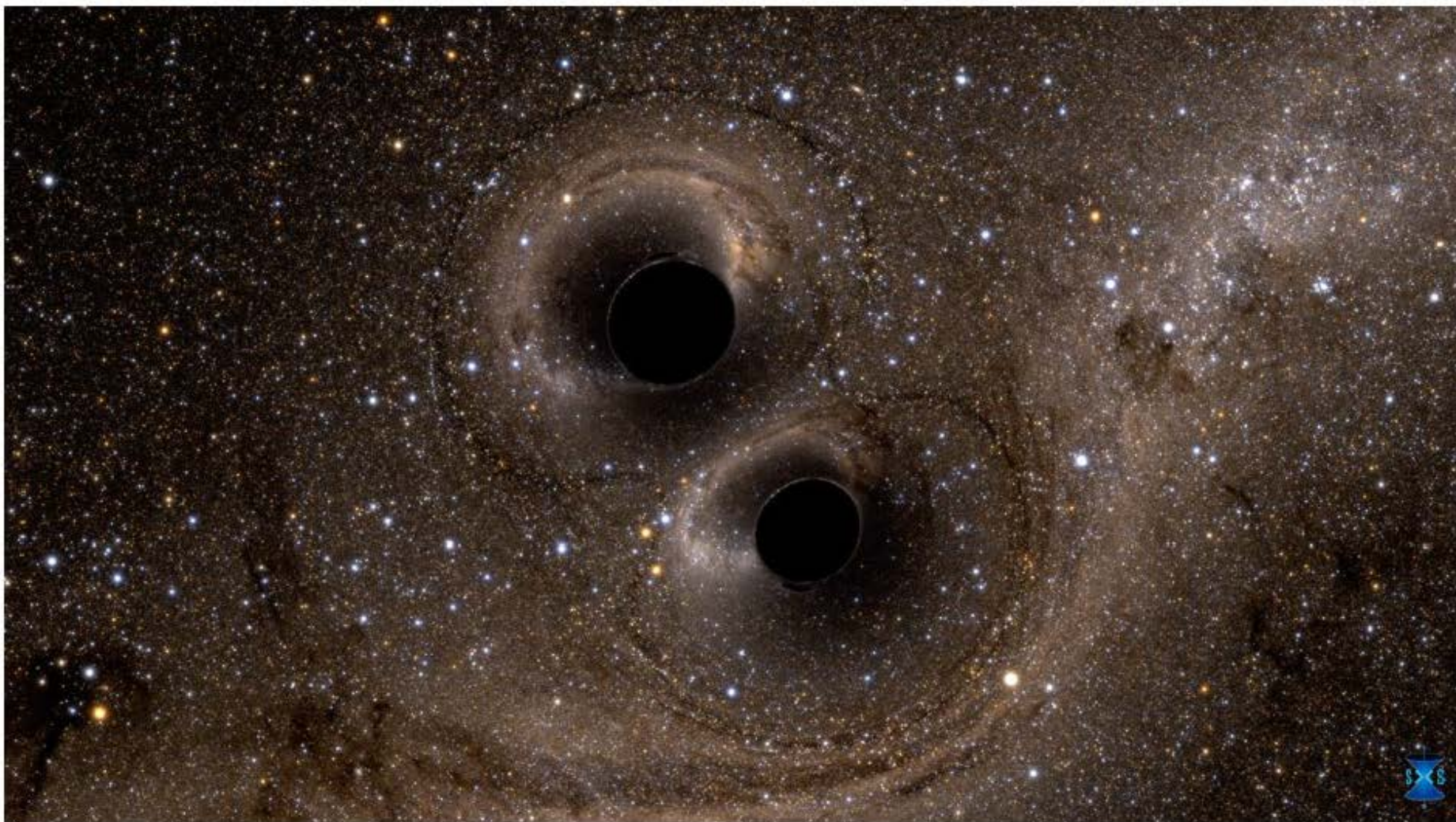
Tyson B. Littenberg  
NASA Marshall Space Flight Center

for the LIGO Scientific Collaboration



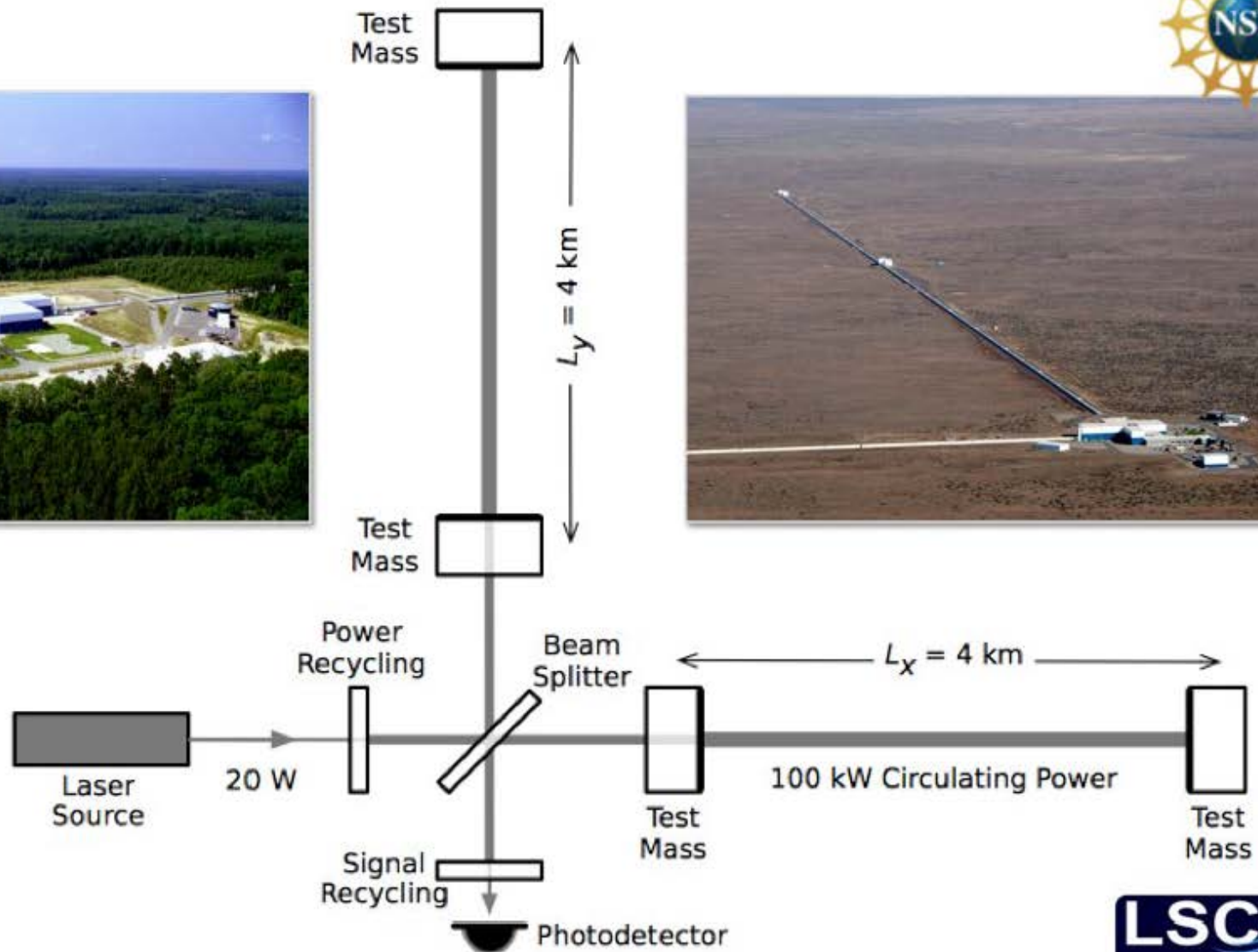
# Gravitational Waves

---





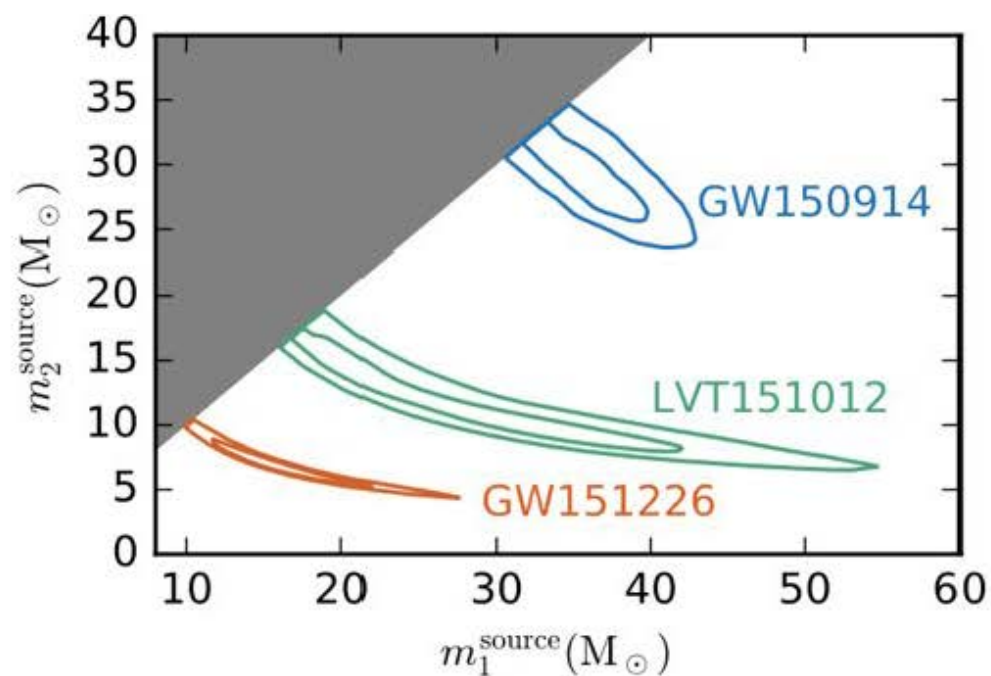
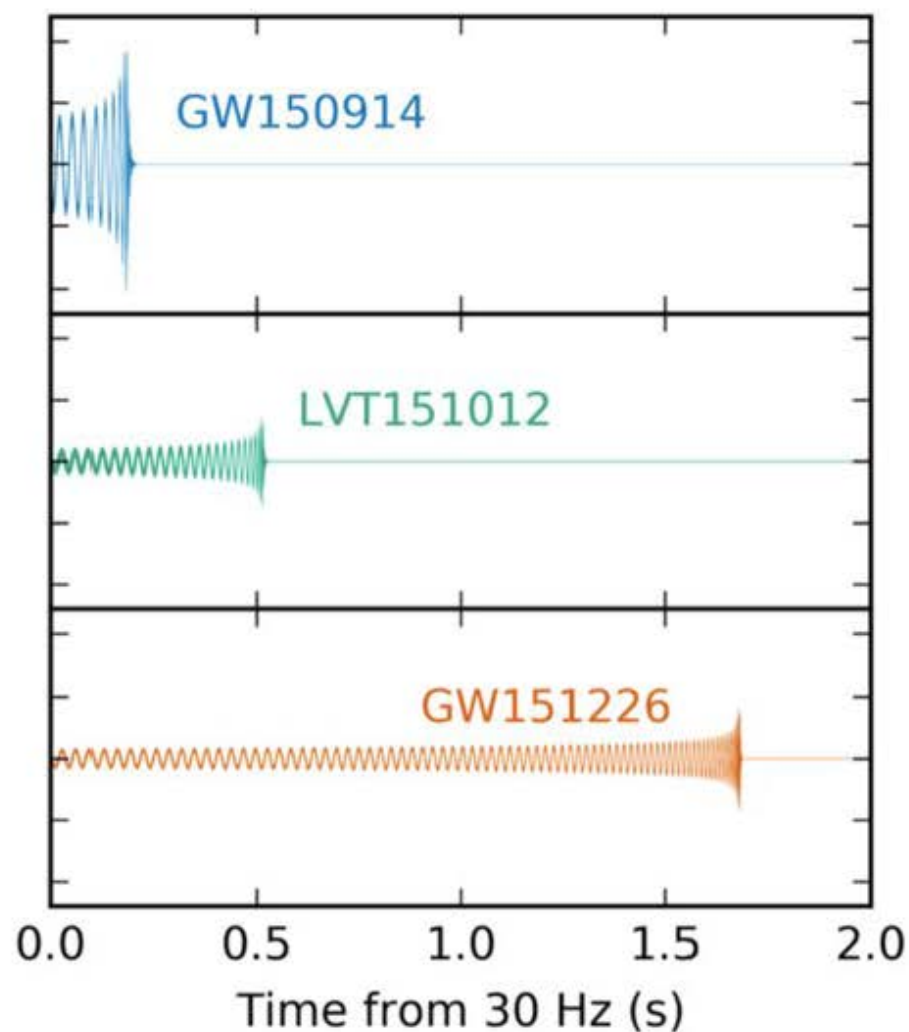
# The LIGO Observatories



# LIGO's First Observing Run (O1)



# LIGO's First Observing Run (O1)

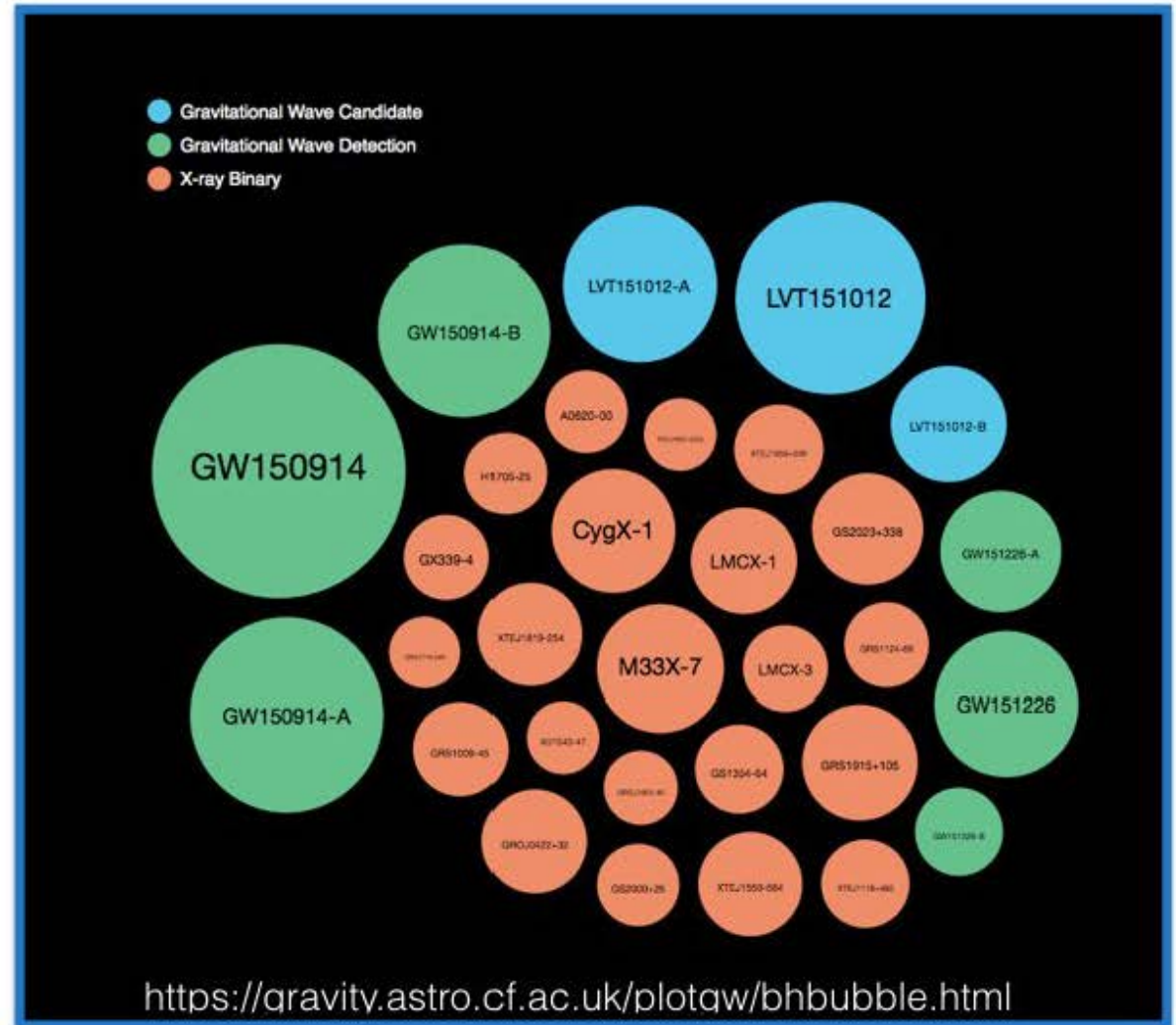




# LIGO's First Observing Run (O1)

## What did we learn about the Universe from O1?

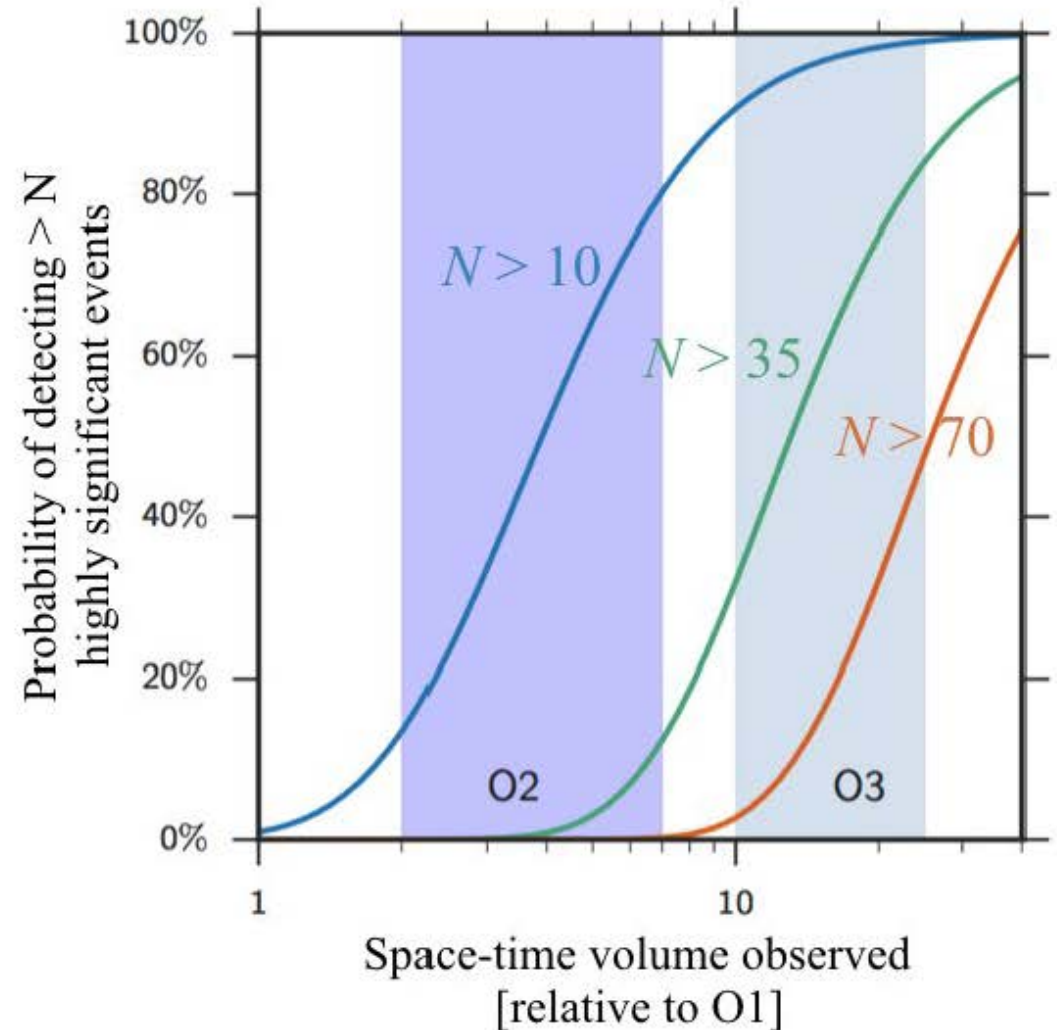
- O1 significantly added to the zoo of known stellar-mass black holes
- The black holes measured by LIGO are at the heavy end of the known population
- GW150914 contained the **largest stellar-mass black holes** ever detected.
- So far, the observed gravitational waves are **consistent with Einstein's general theory of relativity**.



# What to expect from O2

## What we will be asking about black hole mergers:

- How & where are the black holes formed?
- How large can black holes be? How small?
- Are the waves consistent with Einstein's theory?
- Do they produce any electromagnetic signals?



# What to expect from O2

## What we will be asking about other transient sources:

- What is the rate of binary neutron star mergers?
- Do binary neutron star mergers create GRBs?
- What other sources of GW transients are out there?

